WHAT IS CLAIMED IS:

1. A composition of matter comprising:

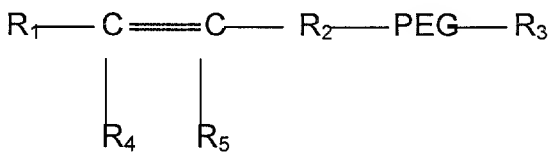
a crystalline colloidal array; and

a polymeric matrix encapsulating said crystalline colloidal array, wherein said polymeric matrix comprises polymerized poly(ethylene glycol) based monomer units.

2. The composition of matter of claim 1, wherein said composition of matter is biologically compatible.

3. The composition of matter of claim 1, wherein said crystalline colloidal array is electrostatically stabilized.

4. The composition of matter of claim 1, wherein said poly(ethylene glycol) based monomer units have a general formula of:



wherein R_2 comprises a functional group having at least two active bonding sites,

R_1, R_4 and R_5 are each independently selected from the group consisting of alkanes, alkenes, arenes, halides, ethers, acrylates, amine groups, amides, thiols, esters, ketones, nitro compounds, carboxy groups, hydroxy groups, and hydrogen, and

R_3 is selected from the group consisting of alkanes, alkenes, arenes, halides, ethers, acrylates, amine groups, amides, thiols, esters, ketones, nitro compounds, carboxy groups, hydroxy groups, hydrogen, proteins, nucleotides, and antibodies.

5. The composition of matter of claim 4, wherein R_2 is selected from the group consisting of ketones and esters.

6. The composition of matter of claim 5, wherein said poly(ethylene glycol) based monomer comprises poly(ethylene glycol) methacrylate.

7. The composition of matter of claim 4, wherein R_3 is selected from the group consisting of proteins, nucleotides, and antibodies.

8. The composition of matter of claim 1, wherein said crystalline colloidal array comprises polystyrene-based colloidal particles.

9. The composition of matter of claim 1, further comprising a crosslinking agent polymerized with said polymeric matrix.

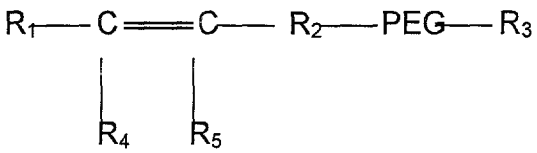
10. The composition of matter of claim 1, wherein upon receiving electromagnetic radiant energy said composition of matter exhibits a visible photonic bandgap.

11. The composition of matter of claim 10, wherein said visible photonic bandgap is capable of shifting upon environmental stimulation of said composition of matter.

12. A composition comprising:

a crystalline colloidal array comprising polystyrene-based colloidal particles in an aqueous medium; and

a polymeric matrix encapsulating said crystalline colloidal array, wherein said polymeric matrix comprises polymerized poly(ethylene glycol) based monomer units represented by:



wherein R_2 comprises a functional group having at least two active bonding sites,

R_1, R_4 and R_5 are each independently selected from the group consisting of alkanes, alkenes, arenes, halides, ethers, acrylates, amine groups, amides, thiols, esters, ketones, nitro compounds, carboxy groups, hydroxy groups, and hydrogen,

R_3 is selected from the group consisting of alkanes, alkenes, arenes, halides, ethers, acrylates, amine groups, amides, thiols, esters, ketones,

nitro compounds, carboxy groups, hydroxy groups, hydrogen, proteins, nucleotides, and antibodies, and

a crosslinking agent polymerized with said monomer units.

13. The composition of claim 12, wherein said composition is biologically compatible.

14. The composition of claim 12, wherein R_2 is selected from the group consisting of ketones and esters.

15. The composition of claim 12, wherein said poly(ethylene glycol) based monomer comprises poly(ethylene glycol) methacrylate.

16. The composition of claim 12, wherein R_3 is selected from the group consisting of proteins, nucleotides, and antibodies.

17. The composition of claim 12, wherein upon receiving radiant energy said composition exhibits a visible photonic bandgap.

18. The composition of claim 17, wherein said visible photonic bandgap is capable of shifting upon environmental stimulation of said composition.

19. A sensory device comprising:

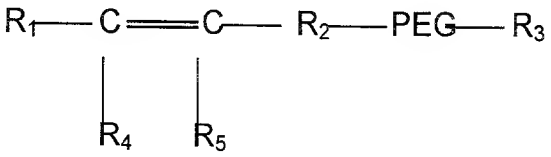
a crystalline colloidal array comprising an ordered lattice structure defining a visible bandgap at a first wavelength;

a polymerized matrix encapsulating said crystalline colloidal array, said polymerized matrix comprising poly(ethylene glycol) based monomer units; and

wherein upon stimulation of said sensory device said visible bandgap is capable of shifting to a second wavelength.

20. The sensory device of claim 19, wherein said sensory device is biologically compatible.

21. The sensory device of claim 19, wherein said poly(ethylene glycol) based monomer units are represented by:



wherein R_2 comprises a functional group having at least two active bonding sites,

R_1, R_4 and R_5 are each independently selected from the group consisting of alkanes, alkenes, arenes, halides, ethers, acrylates, amine groups, amides, thiols, esters, ketones, nitro compounds, carboxy groups, hydroxy groups, and hydrogen, and

R_3 is selected from the group consisting of alkanes, alkenes, arenes, halides, ethers, acrylates, amine groups, amides, thiols, esters, ketones, nitro compounds, carboxy groups, hydroxy groups, hydrogen, proteins, nucleotides, and antibodies.

22. The sensory device of claim 21, wherein said wavelength shift is defined by a chemical reaction between said poly(ethylene glycol) based monomer units and an environmental component.

23. The sensory device of claim 22, wherein R_3 is selected from the group consisting of proteins, nucleotides, and antibodies.

24. The sensory device of claim 19, wherein said wavelength shift is defined by a mechanical stimulation of said sensory device.

25. The sensory device of claim 19, wherein said wavelength shift is defined by a thermal stimulation of said sensory device.

26. The sensory device of claim 19, wherein said wavelength shift is defined by an electrical stimulation of said sensory device.

27. The sensory device of claim 19, wherein said wavelength shift is defined by a chemical stimulation of said sensory device.